WIRING ISDN SERVICE TO MULTIPLE TARGET ROOMS

Introduction

This task-oriented document describes a simple method of wiring ISDN to multiple target rooms. Providing ISDN service to more than one target room **requires new wiring**. The method described here is based on the EIA/TIA 570 standard to ensure value and reduce cabling faults.

Other wiring methods are described, in detail, in NIUF document NIUF 433-94 entitled "ISDN Wiring and Powering Guidelines (Residence and Small Business)." Refer to this publication for clarification of concepts described in this document.

New wiring in the home will support services like POTS, alarm systems, 10BaseT and other future needs. Once the new wiring is in place, and the distribution device is installed, the customer may choose the room(s) for ISDN service. This also allows the versatility of moving the terminal equipment from room to room.

Requirements

The STAR wiring configuration **requires** the following components:

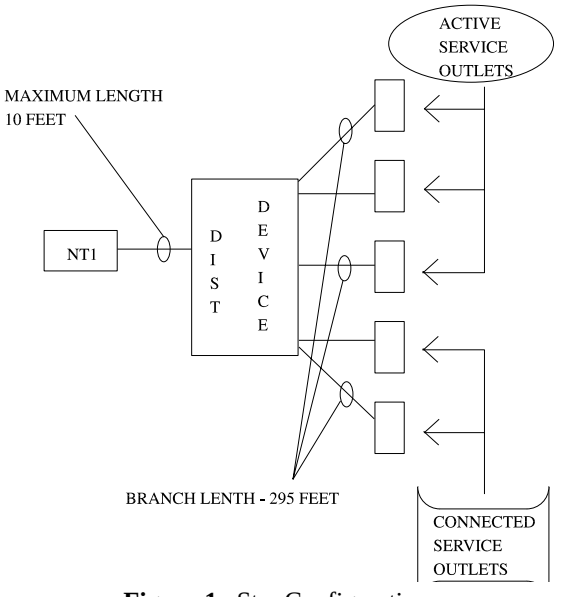


Figure 1. Star Configuration.

- 4-pair (8-wire) UTP cable
- Distribution device with at least 4-pair input & several output pair to rooms served
- 8-position modular jacks (T568A or B standard) - category 3 or better.

NOTE: Terminal equipment won't operate if S/T interface wiring is reversed.

Figure 2. S/T - Star Wiring using Distribution Device
This configuration permits movement of ISDN service from one room to another. Illustration shows ISDN service connected to: bedroom l, den and bonus room.

When multiple outlets are "homerun" to a central distribution point, it is called PASSIVE BUS, BRANCHED MULTIPOINT, or STAR wiring.

TASK - Placement of the NT1 and Distribution Device

Centralized location of the NT1 minimizes the length of both active and connected service outlets. The distance from the NT1 to the demarc connection point is not critical, but the Distribution Device must be within 10 feet of the NT1. Locate the NT1 near an electrical outlet when using an external power supply.

Star Configuration

STAR wiring allows the NT1 to be centrally located where individual cable runs are terminated. The following are recommendations for multiple room station wiring configurations:

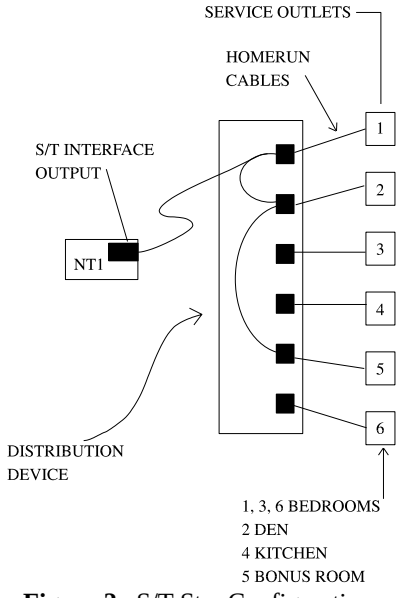


Figure 2. S/T Star Configuration.

- Active service outlets (connected to NT1) -3 or 4, depending on manufacturer
- Connected service outlets (wired to distribution device, not always NT1).
- Maximum branch length-295 feet.
- 50 ohm termination at NT1.
- No termination on terminal equipment.

TASK - Wiring the Service Outlets

Install 4-pair cable from the distribution device to each service outlet. Terminate all 4-pair on a modular jack conforming to T568A or T568B standards (8 pins/8 conductors). Using this standard, all jacks and wiring should be category 3 or better. Label these jacks "ISDN S/T" to prevent accidental connection.

TASK - Powering Selection

Consult the reference: NIUF 433-94, (section 1.C) for detailed information. There are three basic methods of powering ISDN terminal equipment:

- Local Power-some terminal equipment and NT1's include a local power supply co-located with the powered device.
- Remote Power- Supply located other than at the NT.
- Distributed Power- Any combination of multiple (local and remote) power sources.

TASK - Connect your ISDN Service

Verify that the service provider has connected and activated your ISDN service. Service providers often identify ISDN connection points by writing phone number next to a demarc point. Connect the ISDN pair from the NT1 to the connection points of the demarc. Plug-in the "pigtail," for the ISDN demarc, if present. **Caution should be observed when at the demarc. Please refer to section 1.A, Appendix A, of NIUF 433-94 for important information.**

TASK - Connect the NT1

Satisfactory ISDN service depends on proper timing and terminating resistor options.

For the recommended (STAR) wiring configuration, choose the 50 ohm terminating resistance option at the NT1. Refer to the NT1 manual for instructions.

If your NT1 has options for "fixed" or "adaptive" timing, use the default timing option. See the NT1 manual for additional instructions and information on timing.

Plug the NT1 power supply into a wall outlet and follow the manufacturer's instructions. The complexity of this task depends on the equipment being used. Consult the NT1 manual to learn the type of cable required and instructions for connecting the NT1 to the power supply; some companies furnish modular cords. The operation manual will also explain line and NT1 status lamps if present.

TASK - Connect ISDN Terminal Equipment

Connect the terminal equipment directly to the service outlets, unless locally powered. The TE instructions will explain cables, power supplies and terminating resistor options. In the STAR configuration, the TE option is "off or none." Use the straight-through (8-pin modular) cord provided with the TE to connect to the NT1. See NIUF

433-94, section 1.A.2.6 if no cord is provided. Program the TE parameters (DN's, SPID, etc.) provided in your instruction manual. Some parameters (DN's, SPID) are furnished by the service provider. Your ISDN TE is now ready to use.

TASK-Troubleshooting
If your ISDN service is not working, check these items:

- Is everything plugged-in correctly?
- Do status indicators on equipment appear okay?
- Is ISDN TE programmed with SPID and other parameters?
- Are NT1 options (terminating resistors 50 ohms) and ISDN TE (off or none) set correctly?
- Does ISDN TE pass self-test?
- If ISDN TE and NT1 work when plugged into demarc, recheck your wiring

Troubleshooting Wiring
If your service operates correctly at the demarc, but not at the service outlet, verify the wiring. Remember to check ISDN S/T polarity.

Step 1. When the distribution device **isn't** co-located with the demarc: connect the NT1 and the TE to the distribution device to verify the wiring between the distribution device and the demarc.

Step 2. Leave the NT1 connected to the distribution device. Connect the TE to each of the active service outlets to verify wiring between the distribution device and service outlets. If an outlet fails this test, verify that the outlet is cross-connected at the demarc; then check the wiring continuity as shown in figure 3.

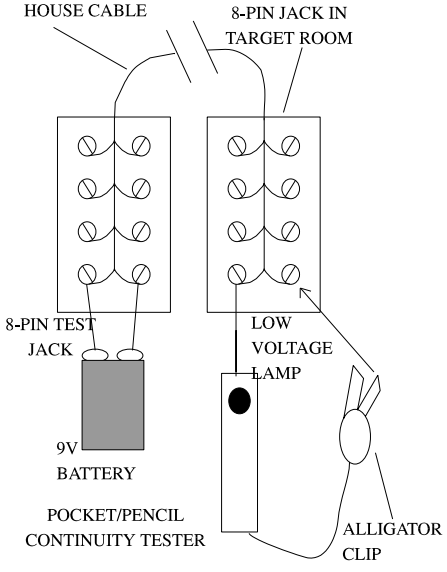
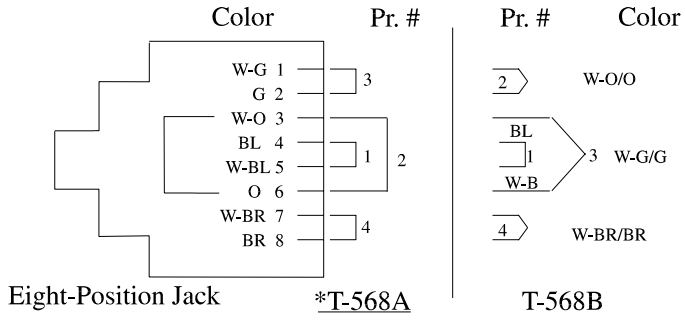


Figure 3. Wiring Continuity.

* DO NOT WORK ON YOUR TELEPHONE WIRING AT ALL IF YOU WEAR A PACEMAKER. Telephone lines carry electrical current.
* Never install telephone wiring during a lightning storm.
* Never install telephone jacks in wet locations unless the jack is specifically designed for this purpose.
* Use caution when installing or modifying telephone lines.
* Use a screwdriver and other tools with insulated handles.
* You and those around you should wear safety glasses or goggles.
* Be sure that your in-house wiring is not connected to the Demarc while you are working on your telephone wiring.
* Do not place telephone wiring or connections in any conduit, outlet or junction box containing electrical wiring.
* Installation of in-house wire may bring you close to electrical wire, conduit, terminals and other electrical facilities. **EXTREME CAUTION must be used to avoid electrical shock from such facilities. You must avoid contact with all such facilities.**
* Telephone wire must be at least 6 feet from bare power wiring or lightning rods and associated wires, and at least 6 inches from other wire (antenna wires, doorbell wires, wires from transformers to neon signs), steam or hot water pipes, and heating ducts.

* Before working with existing inside wiring, check all electrical outlets for a square telephone dial light transformer and unplug it from the electrical outlet. Failure to unplug all telephone transformers can cause electrical shock.
* Do not place a jack where it would allow a person to use the telephone while in a bathtub, shower, swimming pool, or similar hazardous location.
* Protectors and grounding wire placed by the service provider must not be connected to, removed, or modified by the customer.
* Use care not to deform the wire by crimping, knots, sharp corners, etc.
* Check local building codes for safety guidelines.



*US Govt. (Pub. FIPS 174) recognizes T-568A designation only.